



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/830,038	07/17/2001	Klaus Hohn	12406-017001	9454

26161 7590 04/06/2007
FISH & RICHARDSON PC
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER

DINH, TUAN T

ART UNIT	PAPER NUMBER
----------	--------------

2841

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/06/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

09/830,038

Applicant(s)

HOHN ET AL.

Examiner

Tuan T. Dinh

Art Unit

2841

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 27-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 27-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Applicant's Appeal filed on 11/20/06 is persuasive and, therefore, the finality of the rejection of the last Office action is withdrawn.

Noted claim language: from Google search

Two types of siloxane modified polyimide were prepared as coating materials for microelectronics applications and their thermal, mechanical, electrical, adhesive and coating properties were characterized. The coatings prepared were classified as polysiloxane block (type A) polyimides and disiloxane modified (type B) polyimides. All of the polyimides showed excellent thermal, mechanical, electrical, adhesive and coating properties suitable for use in microelectronics coating applications. The type A polyimides have lower dielectric constants and good stress relaxation capability as compared with typical aromatic polyimides. The type B polyimides have excellent adhesive properties to silicon wafers. The polyimide prepared from 2, 2-bis[4-aminophenoxyphenyl]hexafluoropropane exhibited the lowest dielectric constant due to the presence of trifluoromethyl groups in the polymer backbone. Model encapsulated semiconductor devices coated with various polyimides were assembled, and the interface adherence between the polyimide and the encapsulant along with the reliability of the semiconductor devices were examined. Superior interface adherence between the polyimide passivant and the encapsulant was exhibited, resulting in improved reliability of integrated circuit chips. With the incorporation of siloxane moieties into the polyimide backbone these siloxane modified polyimides were shown to be good candidate materials for microelectronics coatings.

Porous solid siloxane polymers carrying diamine functional group of formula $P-(CH_2)_3NH-CH_2CH_2NH_2$ (where P-represents a silica-like siloxane framework) have been prepared by replacement of the iodine in iodopolysiloxane with ethylenediamine. The iodofunctionalized polysiloxane was prepared by polycondensation of $Si(OEt)_4$ and $(MeO)_3Si(CH_2)_3I$. The polysiloxane diamine ligand system exhibits high potential for preconcentration of divalent metal ions (Cu^{2+} , Zn^{2+} , and Cd^{2+}). The tendency to chemisorb these divalent metal ions by the diamine ligand system at the optimum conditions was found in the order: $Cu^{2+} > Zn^{2+} > Cd^{2+}$. Diamine ligand system suffers from leaching of ligand containing groups upon treatment with acidic solutions.

The present invention relates generally to a new adhesive comprising a vinyl containing siloxane-containing polyimide for use in TSM capping of electronic package assemblies with adhesive capability of providing a seal band width of less than 4mm and even less than 2mm, solubility in non-toxic and environmentally safe solvents and durable adhesive properties and to a method for making the polyimides, a method for using the polyimides to make electronic packages and electronic packages made using the adhesive. The preferred vinyl-containing siloxane containing polyimide is a block type polymer containing blocks of a dianhydride-aromatic diamine oligomeric reaction product joined by non-vinyl/vinyl containing siloxane diamine forming links.

A polysiloxane containing terminal imide groups and process for the preparation thereof by a Michael addition reaction comprising reacting a bismaleimide with a polysiloxane diamine. The imide group-containing polysiloxane has good compatibility with organic resins.

One class of urethane- or urea-containing polysiloxane prepolymers involves endcapping polysiloxane-diol or polysiloxane-diamine with an ethylenically unsaturated monomer having an isocyanate group such as isocyanatoethyl methacrylate (IEM). For example, by reacting IEM with hydroxy-terminated polydimethylsiloxane, a prepolymer is formed. In general, this class of prepolymer exhibits similar compatibility with hydrophilic monomers as corresponding prepolymer without the urethane linkage, especially for higher molecular weight prepolymers. Also, in general, these prepolymers are liquid at room temperature. Examples of such prepolymers are found in U.S. Pat. No. 4,605,712 (Mueller et al.).

A second class of urethane-containing polysiloxane prepolymers employs a diisocyanate to create urethane linkages. In general, these prepolymers are prepared by reacting 2 moles of diisocyanate with a hydroxy-terminated polydimethylsiloxane, followed by end capping with 2-hydroxyethyl methacrylate (HEMA). This class exhibits slight improvement in compatibility with hydrophilic monomers such as N,N-dimethylacrylamide (DMA), depending on the molecular weight of polysiloxane. Also, in general, it is a liquid at room temperature. Examples of such prepolymers are found in U.S. Pat. No. 4,136,250 (Mueller et al.).

Claim Objections

1. Claim 32 is objected to because of the following informalities:

Claim 32, line 2, the applicant recites the term "can be" is a render claimed, and that limitation is defined no positive structure.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-7, 27-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berger (U.S. Patent 4,030,948) in view of Prior Art of figure 2 (hereafter PA.

Regarding claims 1-7, 27, and 33, Berger discloses an electronic component (10) having a body (12, see figure 1, column 3, line 6), the component (10) has at least one metallic solder area (30, 32), see column 3, lines 28-30, and in the surface (top and side surface of the body 12) of the body (12), except for the metallic solder area (30, 32), is at least partially covered by an anti-solder coating (34), the coating preventing solder adherence to the coating, see column 3, lines 38-67, column 4, lines 14-66, and column 5, line 2, column 6, lines 12), the coating consists essentially of siloxane or polysiloxane, see column 5, line 2, and column 6, line 12.

Berger does not explicitly disclose the component being an electro-optical or a LED component having a plastic body/housing.

PA shows a LED component (1), which is an electro-optical component as shown in figure 2 having a plastic body/housing.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a component being a LED having a plastic body as taught by PA to modify the component of Berger for the purpose of receiving/transmitting signals, less weight, and low cost for manufacturing.

Regarding claims 28 and 33, Berger discloses an electronic component (10) having a body (12), see column 3, line 6, which is unsoldered component (figure 1, column 3, lines 3-4), the component (10) has at least one metallic solder area (30, 32), see column 3, lines 28-30, in the surface (top and side surface of the body 12) of the body (12), except for the metallic solder area (30, 32), is at least partially covered by an anti-solder coating (34), the coating preventing solder adherence to the coating, see column 3, lines 38-67, column 4, lines 14-66, and column 5, line 2, column 6, lines 12).

Berger does not explicitly disclose the component being an electro-optical component having a plastic body/housing.

PA shows a LED component (1) as shown in figure 2 having a plastic body/housing.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a component having a plastic body as taught by PA to

modify the component of Berger for the purpose of receiving/transmitting signals, less weight and low cost for manufacturing.

Regarding claims 29 and 33, Berger discloses an electronic component (10) having a body (12), see column 3, line 6, the component (10) has at least one metallic solder area (30, 32), see column 3, lines 28-30, in the surface (top and side surface of the body 12) of the body (12), except for the metallic solder area (30, 32), is at least partially covered by an anti-solder coating (34) prior to soldering of the component (10), the coating preventing solder adherence to the coating, see column 3, lines 38-67, column 4, lines 14-66, and column 5, line 2, column 6, lines 12).

Berger does not explicitly disclose the component, which is an electro-optical component having a plastic body/housing.

PA shows a LED component (1) as shown in figure 2 having a plastic body/housing.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a component having a plastic body as taught by PA to modify the component of Berger for the purpose of receiving/transmitting signals, less weight and low cost for manufacturing.

Regarding claims 30, 33, Berger discloses an electronic component (10) having a body (12), see column 3, line 6, the component (10) has at least one metallic solder area (30, 32), see column 3, lines 28-30, in the surface (top and side surface of the body 12) of the body (12), except for the metallic solder area (30, 32), is at least partially covered by an anti-solder coating (34), the coating preventing solder adherence, see

Art Unit: 2841

column 3, lines 38-67, column 4, lines 14-66, and column 5, line 2, column 6, lines 12), the component is a part from any support structure (i.e. the component is not connected to substrate or board, see figure 1).

Berger does not explicitly disclose the component, which is an electro-optical component having a plastic body/housing.

PA shows a LED component (1) as shown in figure 2 having a plastic body/housing.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a component having a plastic body as taught by PA to modify the component of Berger for the purpose of receiving/transmitting signals, less weight and low cost for manufacturing.

Regarding claims 31, 33, Berger discloses an electronic component (10) having a body (12), see column 3, line 6, the component (10) has at least one metallic solder area (30, 32), see column 3, lines 28-30, in the surface (top and side surface of the body 12) of the body (12), except for the metallic solder area (30, 32), is at least partially covered by an anti-solder coating (34), the coating preventing solder adherence, see column 3, lines 38-67, column 4, lines 14-66, and column 5, line 2, column 6, lines 12), wherein the coating has an end, and the coating ends at the component (the coating 34 has an end at a bottom surface 16 of the body 12, see figure 1).

Berger does not explicitly disclose the component, which is an electro-optical component having a plastic body/housing.

PA shows a LED component (1) as shown in figure 2 having a plastic body/housing.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a component having a plastic body as taught by PA to modify the component of Berger for the purpose of receiving/transmitting signals, less weight and low cost for manufacturing.

4. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Berger in view of PA, and further in view of Schmid (U.S. Patent 6,006,512).

Regarding claim 32, Berger and PA do not explicitly show the coating applied to the plastic housing from a hydrous solution.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a coating made from hydrous solution as taught by Berger as modified by APA because Berger teaches the siloxane or polysiloxane coated on a surface of the component, which is the same structure of the invention, so the Berger reference can be or capable of being do so in order to provide less time and low cost for manufacture.

"Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is

Art Unit: 2841

unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)

Such a process limitation defines the claimed invention over the prior art only to the degree that it defines the product itself. A process limitation cannot serve to patentably distinguish the product over the prior art, in the case that the product is the same, or obvious over the prior art. See Product by process in MPEP §2113 and 2173.05(p) and In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985).

Response to Arguments

5. Applicant's arguments filed 01/05/06 have been fully considered but they are not persuasive.

Applicant argues:

(a) Berger does not disclose “an anti solder coating preventing solder adherence to the coating”.

Examiner disagrees because as in column 1, lines 34-40, 62-66, column 2, lines 9-10 of the Berger reference, the coating material (34) is made by silocone or polysiloxane containing a diamine material, which is one of the type material in the family of a polysiloxane. As in a specification of an instant invention that defines the anti-solder coating, which is a siloxane or polysilocane. So the Berger and the invention describe the same type material. Thus, the coating (34) of Berger has the same function as act as anti-solder coating material.

Therefore, the examiner believes the combination of Berger in view of the PA is proper.

(b) Berger's coating does not consisting essentially of siloxane.

Examiner disagrees. First the term "consisting essentially of" is equivalent to the term "comprising" and not the same term "consisting of". Second, in the Berger reference, the coating is made by silicone, which is a larger group of siloxane polymers (see the attached copy paper of the Condense Chemical Dictionary attaching in the previous Office actions).

Therefore, the examiner does believe Berger disclosed the coating made by siloxane.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan T. Dinh whose telephone number is 571-272-1929. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Reichard Dean can be reached on 571-272-1984. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2841

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

A handwritten signature in black ink, appearing to read 'Tuan Dinh', with a long, sweeping horizontal stroke extending to the right.

Tuan Dinh
March 26, 2007.